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REARING EXPERIMENTS  
1937 to 1939

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Coeur d'Alene, Idaho  
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INDEX NO.-



## REARING EXPERIMENTS

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### INTRODUCTION

During February 1938 a report was submitted by the writer covering all the rearing operations conducted at the Coeur d'Alene Laboratory Insectary from its inception in 1934 up to the close of the 1937 season. The present report covers the rearing operations from the spring of 1938 up to May 1, 1939. This includes all hibernating or overwintering insects carried over the winter of 1937-38, those reared to maturity during the summer and fall of 1938, and 1938-39 overwintering material. Emergence activity of 1937-38 overwintering insects began on June 1, 1938. Emergence from 1938 collections began early in July and lasted until the first week of October 1938, requiring daily attention during the four-month period. The bulk of the rearing material, received in larval form during the summer of 1938, consisted of Lepidoptera defoliators, including the hemlock looper, Douglas fir tussock moth, a webworm, Douglas fir looper, and later in the season two species of larch sawfly larvae, representing in all approximately 1,400 larvae.

Two additional species of Hymenoptera were secured during the 1938 season from the hemlock looper Ellopi f. lugubrosa Hlst., one an egg parasite, Telenomus californicus Ashm. and the other parasitic on the looper pupae. A much larger percentage of looper parasitism by an undescribed species of Diptera, Phrynolydella n. sp., was secured than during the 1937 season. The following list gives the order, host, and collection locality of all the insects handled at the insectary during the 1938 season.

LIST OF INSECTS REARED AT COEUR D'ALENE INSECTARY WITH THEIR HOSTS  
AND HOST LOCALITY

Order and Insect	Host	Locality
COLEOPTERA		
<u>Scolytus monticolae</u> Sw.	Douglas fir twigs	Wapiti, Wyoming
<u>Conophthorus monticolae</u> Hopk.	White pine cones	Shoshone N. F. Coeur d'Alene, Idaho
* <u>Spondylis upiformis</u> Mann.	White pine stumps	" "
*Weevil	" " "	" "
*Flathead wood borers	Ponderosa pine	Riggins, Idaho
HYMENOPTERA		
<u>Itonpectis montana</u> Cush.	<u>Ellopia f. lugubrosa</u> pupa	Coeur d'Alene, Idaho
<u>Amblyteles cestus</u> (Cress.)	"	" "
<u>Telenomus californicus</u> Ashm.	" eggs	" "
<u>Itonpectis atrocoxalis</u> (Cress.)	<u>Hemerocampa pseudot-</u> <u>sugata</u>	Hailey, Idaho Sawtooth N. F.
* <u>Hyposoter pallipes</u> (Prov.)	"	" "
<u>Spilochalcis</u> n. sp.	Box elder leaf miner	American Falls, Idaho
<u>Habrocytus phycidis</u> Ashm.	" " " "	" "
<u>Cecidostiba</u> sp.	<u>Scolytus monticolae</u>	Wapiti, Wyoming
* <u>Platycampus (anoplonyx)</u> <u>laricis</u> Roh.	<u>Larix occidentalis</u>	Granite, Idaho
* <u>Platycampus (anoplonyx)</u> <u>laricivorus</u> Roh.	" "	" "
*Webworm parasite	Webworm; <u>Diacrisia</u> sp.	Kootenai, Idaho.



Order and Insect	Host	Locality
LEPIDOPTERA		
<u>Ellopia f. lugubrosa</u> Hlst.	Various conifers	Coeur d'Alene, Idaho
<u>Hemerocampa pseudotsugata</u> McD.	Douglas fir	Hailey, Idaho
* <u>Hemerocampa</u> sp.	" "	Moose, Wyoming. Grand Teton Park
<u>Nepytia canosaria</u> var. Wlk.	" "	Hailey, Idaho
*Webworm; <u>Diacrisia</u> sp.	Alnus sp.	Kootenai, Idaho
*Box elder leaf miner, <u>Gracilaria</u> sp.	Box elder	American Falls, Idaho
*Cone Moth, <u>Dieryctria</u> sp.	<u>Abies grandis</u>	Coeur d'Alene, Idaho
DIPTERA		
<u>Madremyia saundersi</u> Will.	<u>Hemerocampa pseudotsugata</u>	Hailey, Idaho
" "	<u>Nepytia canosaria</u>	Hailey, Idaho
*Parasite, larch sawfly	Larch sawfly larvae	Granite, Idaho
<u>Phrynolydella n.</u> sp.	<u>Ellopia f. lugubrosa</u>	Coeur d'Alene, Idaho

• 1938-39 overwintering

## DEFOLIATORS

### LEPIDOPTERA

#### Douglas Fir Tussock Moth Hemerocampa pseudotsugata McD.

During the latter part of July 1938, a collection of tussock moth larvae was made by Mr. J. C. Evenden, on the same infested areas near Hailey, Idaho, where previous collecting had been done.

The larvae, numbering 369, were received at the insectary on July 25, 1938. They had been transported in a newly completed refrigeration chest containing two wire screen cages and a metal ice container, and arrived in fine condition. These larvae had been collected from two areas one-half mile apart, where 500 female Compsilura concinnata Meig., a Dipterous parasite, and 1000 female Ephialtes examiner Fab., a Hymenopterous parasite, were liberated on each area on July 17, 1937. The tussock moth larvae were placed in rearing cages as soon as received and the results of the rearing experiment are as follows:

#### Plot No. 1

195 active tussock moths were placed in rearing cage with fresh food on July 25, 1938.

Pupation started on July 29, and ended August 18, 1938. The total number of tussock moth cocoons constructed was 12, equal to 6.1 percent of the total number of larvae.



Emergence of the tussock moths started on August 26, and ended August 28, 1938.

The proportion of sexes emerging: males, 3; females, none.

Total emergence, 3, or 1.5 percent of the total number that constructed cocoons.

The remaining nine pupae in the cocoons were parasitized, being equal to 75 percent of the total number of pupae.

The total number of tussock moth larvae parasitized was 32, or 16.4 percent of the total number collected.

The number of larvae dying from disease or unknown causes was 151, or 77.4 percent of the total number.

Construction of cocoons by the Hymenopterous parasite Hyposoter pallipes began on August 1, and ended August 18, 1938.

No Dipterous puparia were secured from this cage. The total number of H. pallipes cocoons constructed was 41.

The total loss in this cage from all causes was 192, or 98.5 percent.

#### Plot No. 2

174 active tussock moth larvae were placed in a rearing cage with fresh food on July 25, 1938.

Pupation started on July 29, and ended August 21, 1938.

The total number of tussock moth cocoons constructed was 37, or 21.3 percent of the total larvae.

Emergence started on August 22, and ended August 29, 1938.

Eleven adults emerged, equal to 29.7 percent of pupation.

The proportion of sexes emerging: males, 8; females, 3, the total emergence of 11 being equal to 6.3 percent of the total number of larvae. The total number of egg masses was one group from one female. The total number of tussock moth pupae parasitized was 26, or 70.2 percent.

The number of tussock moth larvae dying from disease or unknown cause was 137, or 78.7 percent of total number of larvae collected.

Construction of cocoons by the Hymenopterous parasite Hyposoter pallipes began on July 31, and ended August 26, 1938.

Total number of Hyposoter cocoons, 22.

Total number of Dipterous puparia, 3.

Total number of unknown parasites in cocoons, 1.

Total number of parasites, 26.

Total loss in this cage from all causes was 93.7 percent.

None of the introduced parasites were secured from either cage. The mortality of caged tussock moth larvae was much greater in 1938 than for the rearings during the two previous years. If this same loss occurs in the area of infestation the epidemic should rapidly decline.

On September 14, 1937, a shipment of tussock moth cocoons and egg masses was received from Hailey, Idaho. While in transit, emergence of a Hymenopterous parasite, Itopectis atrocotalis (Cress.), began.



and continued for a few days after the cocoons were placed in a rearing cage for overwintering. On June 1, 1938, emergence of newly hatched tussock moth larvae began from the overwintering egg masses received on September 14, 1937, followed by an emergence of the Diptera parasite Madremyia saundersi Will. and Itopectis atrocotalis. None of the introduced parasites were secured from this lot of material, nor any egg parasites.

A collection of 22 small Dipterous puparia was made by Mr. J. C. Evenden on September 2, 1938, from the duff on the infested areas near Hailey, Idaho. These puparia are smaller than the ones secured by rearing from plot No. 2 and may be the introduced Dipterous parasite or a different species than was reared at the insectary. These puparia have been overwintered at the insectary, along with all the parasites secured from the tussock moth larvae and pupae from plots No. 1 and No. 2 collected in July 1938.

Douglas Fir Looper  
Nepytia canosaria var. Wlk.

Larvae of this moth occur in association with the tussock moth larvae feeding on Douglas fir in the Sawtooth National Forest near Hailey, Idaho. Fifty-three Nepytia larvae were separated from the 1938 collection of tussock moth larvae and placed in a separate cage on July 26, 1938.

Pupation began on August 22, and ended September 8, 1938.



Thirty-five moths emerged between August 22 and September 8, 1938, equal to 66 percent of the total number of larvae collected. Four Dipterous parasites, Madremyia saundersi Will., also emerged between August 22 and August 30, 1938. This fly was reared from the Douglas fir tussock moth pupae during the 1937 and 1938 seasons, but none were secured from the looper larvae during 1937. The larval stage of this moth apparently lasts much longer than that of the tussock moth, seems to be much more free from disease and parasitism, and no doubt causes considerable defoliation of the Douglas fir in the infested region.

Hemlock Looper  
Ellopia fiscellaria lugubrosa Hlst.

An epidemic of this looper reached large proportions during 1937 in northern Idaho and western Montana.

In 1938 a marked decrease was noted in many infested areas. Part of this decrease was probably due to the increase of natural enemies, particularly parasites. During June 1938 a beneficial egg parasite, Telenomus californicus Ashm., was reared from overwintering eggs collected on a heavily infested area on the Coeur d'Alene National Forest. In addition to the egg parasite two species of Hymenoptera and one of Diptera were reared from Ellopia pupae in 1938. During the early part of September 1938, countless thousands of the Dipterous parasite, a large-sized fly, could be seen in flight in the

sunny openings on the infested areas on the higher ridges of the Coeur d'Alene National Forest. This species of Diptera was found to be new and is soon to be described.

Webworm  
Diacrisia sp.

A very destructive species of webworm in the larval stage was collected from alder, by Mr. Evenden, during August 1938 in the vicinity of Kootenai, Idaho. Large areas of alder are being heavily defoliated by this insect. A number of these larvae were reared to the pupal stage at the insectary, and it is hoped to secure a good series of adults as well as parasites during May or June, 1939, from the overwintering cocoons.

Box Elder Leaf Miner  
Gracilaria sp.

While driving through the southern part of Idaho in September 1938, Mr. Evenden found that the box elder, particularly in the vicinity of American Falls, was being severely injured by this insect. A collection was made of the infested leaves, and placed in rearing cage at the insectary.

Two species of Hymenopterous parasites emerged during October 1938, one of which was found to be new and undescribed. The balance of the leaf miner pupae concealed in the box elder leaves have been overwintered, hoping to secure a good series of adults.



## HYMENOPTERA

### Larch Sawflies Platycampus (Anoplonyx) laricis and laricivorus Rowher.

A heavy infestation of these two species of larch sawfly in association was located in the vicinity of Granite, Idaho, during the summer of 1938. The infestation could be traced for miles by the discoloration of the larch foliage. A number of half-grown larvae were collected on this area and placed in rearing cages, hoping to secure any parasites that might be present. A large percent of the larvae constructed cocoons in the duff on the floor of the cages, where they have overwintered.

During October 1938 a collection of 823 of the sawfly cocoons was made from the duff on the infested area. Indications were present of a Hymenopterous and a Dipterous parasite working on the sawfly larvae. These cocoons were shipped to the laboratory at New Haven, Connecticut, for the rearing of parasites.

The type specimens of these two species of larch sawflies were secured by rearing, by the writer in 1921. These two species were found in association at that time in an infestation in larch in the vicinity of Coeur d'Alene, Idaho.

Respectfully submitted,

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